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ABSTRACT

This monograph presents educational innovative practices in India organized into categories of resource-mobilization, structural changes, curricula improvement, introduction of new instructional techniques, and teacher development. Innovations, often pragmatic adaptations of old ideas, tend to cluster in one geographical area, require strong administrative support, and represent a struggle to escape traditional practices. The third in the Unesco Asia Series of national inventories of educational innovations draws largely from Maharashtra State and reflects human effort and administrative leadership. (Author/DW)

International Bureau of Education
& Asian Centre of Educational
Innovation for Development

Experiments and innovations in education 11

Asian series

# Educational innovation in India

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Experiments and innovations in education No. 11

*Asian series*

# Educational innovation in India

by Dr. Chitra Naik

Director of Education
Maharashtra State, India

Study prepared
for the Asian Centre
of Educational Innovation
for Development

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# Préface

The third in the Asian series[1] of national inventories of educational innovation deals with the situation in India. Mrs. Chitra Naik's study, drawing largely from the experiences in the State of Maharashtra, shows clearly what can be accomplished by human effort and a dedicated administrative leadership — in spite of the magnitude of the challenge and the very limited material resources available.

While the views expressed by the author are not necessarily those of Unesco, it is believed that many educators in the Third World will find much to inspire and guide them in their efforts to improve educational provision in their own country. The Secretariat wishes to express its thanks to Mrs. Naik for her valuable contribution to this series.

1. The first two were: Wong, Ruth. *Educational innovation in Singapore*. Paris. The Unesco Press, 1974 (Experiments and innovations in education, No. 9).
Ayman, Iraj. *Educational innovation in Iran*. Paris, The Unesco Press, 1974 (Experiments and innovation in education, No. 10)

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## Introduction

Educational innovation in India needs to be regarded as one aspect of a multi-dimensional effort for the transformation of Indian life since the achievement of independence in 1947. It is an extremely complex task to convert an economically underdeveloped traditional society, which has been under colonial rule for a long time, into a self-reliant and modern nation. The administrative structures and financial procedures inherited from the colonial government are geared to maintaining the status quo, and they stubbornly defy attemps at injecting into them any degree of flexibility or dynamism. The hierarchy-bound colonial administrative practices uphold authoritarianism and severely curb participatory decision-making. Promotion of democratic efforts and the harnessing of available resources for developmental purposes find very little scope within this inflexible 'steel-frame', constructed it seems for exactly the opposite purpose.

In such a situation, the launching of innovations presents a knotty problem. During the first stages of India's transition towards democracy and modernity, resistance to certain innovations has also been offered by sections of society. The ignorance of the masses and the dominance of the status-hierarchy in socio-economic life are factors that breed a suspicion about innovations. Disturbance of traditions builds up anti-innovation groups whose attack is often directed not only against the innovative projects but against their promotors as well. Opposition and criticism make some innovators so pre-occupied with self-protection and self-security that they simply retreat. Besides such psycho-social reactions, political, economic, ethical and even philosophical reactions sometimes cluster around educational innovations in India. The country's colonial heritage, as well as its long cultural traditions extending over four thousand years, seems to militate against planned change. However, in spite of innumerable limitations, educational innovations have been emerging in India under the impact of unrelenting pressures of accelerating enrolments, the rising expectations of the masses, the urgency for rapid economic growth

and the inescapable necessity to strengthen and protect democratic socialism as a way of life.

In affluent countries, the launching of innovations is comparatively easy because financial aid can be readily provided. But in a developing country, the scarcity of resources adds greater intensity to the challenge of change. Therefore, the first and foremost concern of the educational innovator in India is how to give positive values to such scarce resources as money, time and expert personnel. The second concern is to operate within an educational system which requires a thorough overhaul of its structures, functions and processes. One may be aware the system cannot be transformed without a reconstruction of such educational and conceptual terms as pupil, teacher, supervisor, administrator and so on. But one cannot afford to wait for a total transformation because the immediate problems of teaching and learning or administering and financing the system await solution and it is against this perspective that educational innovations in India have to be considered.

There are four major needs for educational development in India: effective provision of universal elementary education for the age group 6 to 14 years; improvement of standards; curricula changes which would gear the system more to productivity than to the elitist's goal of power and status; and improvement of educational planning and administration. Most of the innovations launched in the past 15 years and particularly during the decade 1960-70 have been motivated by these needs.

A critical evaluation of the education system in India began with the appointment of the University Education Commission in 1948, and continued when the Secondary Education Commission was appointed in 1954. Their reports stimulated some innovative effort in higher and secondary education, and in 1964 the Indian Education Commission was appointed to make a comprehensive review of the entire education system. Its report emphasized the need for a complete transformation of the educational system for making it responsive to the challenges of the country's socio-economic development. Several innovative ideas put forward by the Commission have since been converted into projects. Thus, the stream of innovations which began in 1955-56 gathered momentum in the five years 1965-70.

This monograph covers attempts at innovations in resource-mobilization, structural changes, curricula improvement, introduction of new instructional techniques, and teacher development. It appeared that: (i) innovations have a tendency to cluster in a

geographical area, (ii) they require continuous guidance and support from status leaders in administration, and (iii) they achieve some measure of success only if the involved or affected parties are suitably orientated towards their goals and processes.

Except for two or three instances, none of the innovations has been evaluated. Only one innovation which began as an action-research project has a built-in provision for continuous evaluation and modification. However, there is a noticeable trend towards planning an innovation as a series of steps beginning with experimentation on a limited scale, continuing through a phase of wider testing and then finally reaching the stage of diffusion.

## I. Resource mobilization

*The school improvement movement in Tamil Nadu*

Children in rural India are chronically hungry. They are readily attracted to places that offer food. Therefore, arranging for midday meals in schools has been emphasized as a major method for inducing children at the primary age group to enrol in school. But with such large numbers to be fed the financial burden cannot be endured by the exchequer of any State in the country. Attempts have been made in several places, therefore, to persuade the community to supply school meals or snacks by collecting contributions of locally available food grains. But only in Tamil Nadu could a public movement be organized in 1956 by the Education Department, to supply free midday meals. In 1957, the State Government decided to supplement the public contributions.

A carefully planned school meals 'pilot project' was initiated in 1958 in the National Extension Service Block of Kadambattur. It sought to provide other services besides school meals. Its programme included elementary school buildings, painting of blackboards, a small library in each school, simple types of sanitary arrangements, and provision of pure drinking water.

Under the leadership of the Director of Public Instruction of Tamil Nadu, the pilot project progressed well and the contributions made by the community often extended beyond the programme's requirements. They ranged from donations of lands, buildings and equipment to portraits of the national and international leaders. The community often supplied uniforms to the children, particularly to the girls. The threefold emphasis on midday meals, school improvement and free uniforms enabled the community to increase not only the levels of enrolment and attendance but also the quality of education. The school and the community established a rapport which was traditionally missing. The Director of Public Instruction noted: 'The school improvement movement concentrated upon the creation of a self-confident, self-reliant and self-sufficient rural society, vigilant about and actively participating in the

promotion of educational activities, rather than amassing wealth for the schools.

The pilot project's success opened the way for greater dissemination. A systematic 'social survey' determined that in each village the local officer of the Education Department and a committee of local leaders prepared a detailed list of their school needs. These lists were given to the local Education Officer and a campaign was planned to collect these items by the teachers and the community.

The needs of the schools were first made known to the community, and donations, contributions and promises of contributions were collected. A conference followed at District headquarters or the headquarters of the Education Officer's area of operation ('the'Range'). All articles donated by the public were exhibited at this conference, to which donors and important dignitaries were invited. The donor's generosity was publicly acknowledged in front of leaders from villages which had yet to participate in the movement. The enthusiasm they witnessed would stimulate them to adopt the movement in their own villages.

The exhibition of contributions invariably introduced a spirit of competition among officers and communities, and this increased the effect of the movement. In the course of its expansion the movement embraced donations ranging from school buildings, playgrounds, furniture, teaching aids, library books, uniforms, the supply of drinking water, provision of sanitary facilities and provision of midday meals. Free supply of textbooks and building up textbook 'banks' is a new and popular feature of the movement.

The programme of schoolmeals which was entirely a community responsibility in its initial stages has now been developed as a collaborative project between the community, the State Government and CARE. It provides midday meals to children for 20 days a month, six days are covered by the CARE programme and 14 days by the joint programme of the community and the State Government.

From the first stage of informing the public about the usefulness of the programme to the detailed follow-up of each school improvement conference, the responsibility borne by the officers of the Education Department has had little precedent. Individual dynamism, combined with local factors, built this movement and spurred it on continually. It was a co-operative endeavour by the status leaders of the Education Department and the natural leaders of the community in Tamil Nadu and has led a few other States to launch similar movements but without similar success.

It is noteworthy that in Tamil Nadu no special incentives have been offered to any officer nor has any relief been provided from his routine duties. For instance, the local officer, i.e., Deputy Inspector of Schools, is expected to visit the schools in his range three times a year, carry out annual inspections, help conduct the public examinations and organize in-service education of teachers. The school improvement movement constitutes an extra task. The only incentive which activates him to give his best is an assurance by the Department that his performance in the conduct of the movement would be highlighted in comparison with the achievement of his colleagues in other ranges or districts.

The teachers are enthusiastic because it secures for them better equipment, more facilities for teaching, greater co-operation from pupils and a closer and more informal relationship with the community. Besides, while selecting teachers for State and national awards, their participation in the movement is always taken into consideration. In order to orientate new teachers towards this movement, the curriculum of primary teacher training in Tamil Nadu has included this subject for detailed study. Trainees undertake a school improvement drive in relation to the practising schools attached to the training institutions. Visits to the conferences by government officials and political leaders act as a direct incentive to the communities concerned, because such visits enhance their prestige.

In this movement the community visibly contributes to the improvement of its school and is confident that every gift it makes will be used for the benefit of its children. The publicity given to each donor, whatever the donation, is a particular incentive which satisfies their need for personal recognition. Those who donate articles and equipment have their names displayed on these items which gives the donor greater satisfaction, in addition each gift is prominently displayed at the school improvement conference. Stock registers are maintained in each school to record each donation, and these are open to scrutiny by donors who want to ascertain whether their donation is being put to proper use. The donors often help with repairs in their concern about helping the schools to maintain their gifts in good condition.

Careful planning and implementation of the school improvement movement account for its sustained success. Among the outstanding features to be noted are: the continuity of the efforts of the Education Department in adapting and expanding the movement; the appropriate appeals to the motivations of teachers, parents and

local community leaders; and the tremendous harnessing of human energy and untapped material resources and pooling together of local, State and external funding.

*Constructing better and low-cost school buildings*

Approximately 30 per cent of primary school buildings in India were constructed for school purposes. The remaining 70 per cent are provided by private houses, temples, village-panchayat-offices and whatever available structures a village can offer.

The financial arrangements for constructing primary school buildings differ amongst the States. Generally, shared financing is practised by the community and the State Government, but in most parts of the country the level of poverty is such that it is not possible for the community to collect enough money for primary school buildings. Shortage of funds, however, is not the only problem. Timber, cement and steel are in extreme short supply, and the traditional building designs are unsuitable for new constructional techniques. The problem, therefore, requires the attention not only of architects and engineers who can design low-cost school building, but also of educationists. The Central Building Research Institute (CBRI) in Roorkee has undertaken to tackle this problem both from the technical and the educational viewpoints. Such factors as the child's anatomy, the individual space required, the shapes and sizes of classrooms most convenient for the changing patterns of the curriculum, storage space, fixtures and furniture, proper lighting and ventilation, climatic conditions and the use of locally available materials have been critically examined in research projects conducted by the CBRI.

In 1966 the CBRI and the Ministry of Education jointly established a National School Building Development Group, and State-level groups have since been established. The CBRI has constructed prototypes for single-teacher schools, multi-teacher primary schools, secondary schools, and school and college hostels. It has constructed primary school buildings according to its new designs in Goa, Punjab, Kerala and Tamil Nadu; these have led to an overall space economy of 12 to 20 per cent in comparison with traditional types of buildings.

In collaboration with the CBRI, the School Building Development Group of Maharashtra took up a study of the school buildings in Marathwada, economically the most backward region of the State.

A survey of 2,250 schools covering the five districts which constitute this region was carried out. Plans of buildings, methods of construction and implementation strategy for the total school building programme for Marathwada have been given detailed recommendations in the survey report. Three prototype buildings have been constructed in the region, on different types of soils and in different climatic conditions. It has been found that the CBRI designs effect a saving of about 20 per cent per school room, a considerable cost reduction in view of the magnitude of the building problem. Recently, the Uttar Pradesh State Government has entrusted the CBRI with a 50 million rupee programme of construction of school buildings.

The non-traditional designs prepared by the CBRI have met with the approval of educators and educational administrators. However, many villagers do not often appreciate them since they fail to include the traditional front veranda. In the new designs a circulating space, equivalent in area to the veranda of the traditional school buildings, has become a part of the interior of the school. The villagers argue that before the school opens, or after it closes, the veranda serves as a shelter where they can relax and gossip. Resistance to the new designs is also noticeable among Public Works Department officials in some States. In most cases it was necessary to reorientate them in the concept and methodology of designing school buildings and carrying out their construction in a modern way. Among the younger engineers, however, the CBRI designs have evoked much interest.

Since cement and steel are expensive, the CBRI is now investigating the possibility of utilizing local materials available in different parts of the country and making their designs more flexible accordingly. Centres for the mass production of some of the parts of school buildings, in proximity to 50 or 60 villages, is also being considered for further savings in costs and for training village youth in construction techniques.

*The Gram Shikshan Mohim: village education movement*

The extent of illiteracy in India is appalling. Efforts to eradicate it have been made in different ways in different parts of the country. On the eve of independence in 1947, the figure for literacy was 16.6 per cent and it rose to 24 per cent by 1961; today it is about 35 per cent. In Maharashtra State, it has increased from 30 per cent in 1961 to 39 per cent in 1973.

In April 1972, Unesco awarded the Gram Shikshan Mohim (Village Education movement) of Maharashtra State the Reza Shah Pahlavi prize for outstanding work in literacy. The Mohim (which is the Marathi word for movement) is an innovation in several ways. Prior to 1960, the responsibility for literacy work used to be entrusted to Deputy Educational Inspectors working at the district level. They persuaded primary teachers to conduct night classes for the illiterate rural population, and the teachers were paid 4 rupees per adult made literate, the enthusiasm of the villagers for literacy was so poor that in spite of the teachers' efforts attendance in literacy classes was always low.

In 1960, however, the Social Education Committee which functioned under the District Development Committee of Satara District in the State, decided to stimulate the villagers themselves to undertake a large literacy programme. Several mass meetings were organized by the Committee throughout the district, and each village was encouraged to appoint a special Gram Shikshan Committee composed of representatives from many local interests such as social and political leaders, officials, co-operative societies, farmers' unions and teachers. A woman member, preferably a teacher, would invariably be included on the Committee. The duties of this Committee included publicity to attract illiterate adults to the classes, a door to door census for making lists of illiterate adult men and women, identifying educated persons who could teach in the classes, fixing the location of the classes and deciding their working hours, allocation of teachers to different classes and, with help from the Panchayat and the community, providing such equipment as blackboards, lamps, charts, slates, pencils, and other materials.

In India, each district is divided into several development blocks and each block covers a population of from 60,000 to 100,000 people. The major responsibility for implementing the scheme in Maharashta State has been placed on the Block Development Officer. Inspecting officers of the Education Department help with publicity and pay frequent visits to the classes to ensure they are being organized systematically. The members of the local committee also try to see that the classes function according to the scheme and that adult illiterates attend them regularly. Women who are unable to attend classes for reasons of social customs or heavy pressure of household chores, are visited in 'home classes' by a literacy worker and given instruction as and

when possible. In some households where there are school-age children, the children pass on their knowledge to their illiterate elders, particularly to women. This programme is practised intensively for about 4 months during the slack period in agriculture activities and, towards the end of the period, literacy tests are administered. The tests cover reading, writing of simple sentences, knowledge of numbers up to 100, simple arithmetic, maintenance of daily accounts and some general knowledge. Those who fail are again helped to make up their deficiency and given the test again. This process is carried on until a village achieves 100 per cent literacy.

The reading materials for the classes are provided by the State Government and these consist of charts, strips and booklets. Simple lessons on matters of daily life, agriculture, health, information about Maharashtra State and some information about India are included in the charts and booklets which cost ½ rupee per adult under literacy instruction. The equipment provided by the community also works out to a similar amount, thus the total cost of making one adult literate is approximately 1 rupee. The main contribution of the Gram Shikshan Mohim has been to reduce the cost of the literacy programme.

The motivation offered to the village is similar to that utilized by the school improvement movement in Tamil Nadu. Public recognition is given to their efforts in an elaborate ceremonial function. The names of the neo-literates are recorded in a special form, and as soon as a village is found to have 100 per cent literacy, its name is communicated to the officials supervising the movement. A function to celebrate the achievement is then organized and a high official or a political leader is invited to give a speech of congratulation and to encourage them to continue their work. The neo-literates also make speeches and give a demonstration of the standard of literacy attained. This function, called the Gram Gaurav Samarambh (village congratulatory function) is accompanied by a programme of devotional songs.

An impression was formed in 1966 that though several villages achieved literacy, the social content of the lessons had made little impact on their daily lives. Personal and environmental hygiene, sanitation, pure drinking water supplies, street and house cleanliness and even the condition of the village school left much to be desired. It was decided, therefore, not to celebrate

a congratulatory function unless the villagers, together with their achievement of literacy, also demonstrated that they could apply their new learning towards village improvement. This objective has been difficult to achieve, and in consequence the number of congratulatory functions has fallen in recent years.

The problem of preventing a lapse into illiteracy has yet to be successfully tackled. Further education of neo-literates will be conducted in organized classes accommodating ten adults at a time, with book sets each of ten booklets circulated to each group by primary school teachers. The work of conducting the circulating library for the neo-literates, entrusted to the teachers, is not always without difficulty. Teachers are transferred or some of the neo-literates move from the village in search of work or for other reasons. The initial enthusiasm aroused by propaganda and kept up by the prospect of participating in a large congratulatory function in the presence of an important dignitary often evaporates quickly once the function is over.

In a survey conducted by the Maharashtra Education Department, only about 44 per cent retained their literacy. Such reasons as unattractive printing of the booklets, unsuitability of some of the subject matter, and lack of a suitable atmosphere to induce the adults to read and use their literacy for improving their work or environment are found to be responsible for the lapse of 56 per cent of the literate adults into illiteracy.

If the high rate of lapse is taken into account, the real cost per literate adult works out to more than 2 rupees. But even this figure is quite low, and this is because of the purely honorary work undertaken by teachers and others.

This literacy campaign has had a significant success in 11 out of the 25 rural districts of Maharashtra. It has been extremely successful wherever full assistance has been given by the Departments of Co-operation, Agriculture, Health, Social Welfare, Rural Development and Publicity. Local officials from the Revenue, Police and Judiciary Departments have also helped the campaign in many places, but co-operation and co-ordination have been inadequate, the campaign has placed a great strain on teachers and officers of the Education Department. The major success of the movement has been with the 14 to 25 years age group. Adults between the ages of 30 to 50 years have exhibited little interest in retaining the literacy they achieved during the movement.

A full-time special officer in the Directorate of Education

controls this movement, with his chief task being the arrangements for the production and distribution of reading materials and maintaining communications with the districts. The Education Department machinery at the district, block and village levels also takes the literacy movement in its stride. There is a strong feeling, however, that the heavy routine work to be undertaken once the initial tempo of the movement is over, that the personnel would be disinclined to attend to the additional tasks of preventing lapse into illiteracy. Therefore, giving specific administrative support to this literacy campaign appears essential for its further progress.

Another factor which hampers the movement's progress is the absence of training for persons it uses as literacy workers. When training is provided, when better reading materials are supplied and when regular administrative and supervisory machinery is created, it would be possible to consolidate the gains initially made by the movement. The Gram Shikshan Mohim has considerable potential for effective eradication of illiteracy. With some reorganization in the light of its evaluation, it should be possible to exploit these more fully.

*Inexpensive pre-school centres*

Under various programmes of health, education and nutrition, 2.1 per cent of India's pre-school children are presently covered. This is a fairly creditable achievement, taking into account the size of India's population and the low level of its economic development. The Indian achievement in this area has been due to a tradition of pre-school education which began towards the end of the 19th century. Most of the effort in the pre-school sector has been voluntary and a variety of approaches to the problem of pre-school education has led to the development of different types of organizations and programmes. However, new emphasis is now being placed on services to the pre-school group from the viewpoint of improving the health and productivity of the population as a whole and for preparing a strong base for universal primary education. Some States have taken innovative approaches to the provision of pre-school services, particularly pre-school education. The approaches adopted by Tamil Nadu and Maharashtra are particularly interesting. They emphasize local effort and low expenditure.

In Maharashtra, a pre-school centre is called a *Balwadi*. This

centre is intended for children aged 4+ and 5+ who will become eligible for admission to grade I in the following year. The duration of daily activities may be up to three hours, and the grade I timetable is to be appropriately reduced or altered to enable the teacher of that class to find time to conduct the centre. A teacher who has to work for six hours a day would therefore be conducting a pre-school centre for about two hours and a primary class for about three to three and a half hours. Reducing school hours for grade I is also expected to reduce absenteeism and truancy. In rural areas it is extremely difficult to persuade children to attend school for five hours a day because they have of necessity to help with household chores or to look after the cattle. Besides, rural children are used to playing outside and resent the loss of their freedom when they are made to sit in the classroom. Consequently, truancy and absenteeism are very common in grades I to 4. School attendance from this viewpoint persuades some educationists to feel that it would be preferable to make only a three-hour attendance obligatory for pupils of grade I in order to help them to gradually get used to the routines of the school and not to expose them to the traumatic experience of full-time school attendance immediately on enrolment. If a three-hour session for grade I is to be held (on an experimental basis) it would be possible for the same teacher to conduct, for about two hours, a pre-school centre for younger children who would be entering the school one or two years later. The teacher costs in this instance are nil, and the community is expected to donate simple equipment and play materials to the Balwaldi. Supervised play, songs, stories and a programme of cleanliness are part of the Balwaldi schedule.

The primary teacher training curriculum in Maharashtra orientates the teacher in pre-school techniques which are expected to be used even in grades I and 2, and this has formed a suitable base for developing a pre-school programme. A noteworthy feature of the project is the use of pupils from the top classes in the primary school as assistants to the teacher who conducts the pre-school centre. These pupils help organize games, teach songs and stories, conduct physical education activities and carry out a cleanliness check-up. They also organize and lead excursions, teach simple crafts and generally look after the young children as if they were all one family. The pre-school centre can be made more informal and attractive by this measure and might also help the pre-school children to overcome their fear of the school

as a place of strict discipline. In addition, this arrangement might enable the older pupils to become more sociable and could even lead to developing in them a liking for teaching and social service.

Although it was decided to start 1,000 such centres during 1971-72, only a few have begun operating. Inadequate communication between those who formulated the project and the teachers and the communities who are expected to implement it appears to be the main difficulty. It may be useful, perhaps, to set up a small number of pre-school centres, direct their work for a year or two, evaluate the project thoroughly in the light of its basic assumptions, and then re-adjust it for wider testing and subsequent implementation.

Tamil Nadu has evolved a different model for pre-school centres. Any village where the community is prepared to employ a childcare worker and pay her an honorarium of about 20 rupees per month may conduct a pre-school centre. On an average, 30 to 40 children attend the pre-school, and midday meals are supplied to about 800 pre-schools with assistance from CARE. Some equipment is donated by the community and some is given by the State Government. A total of 1,240 pre-school centres function in the rural areas and the construction of buildings for 1,000 more has been planned by the State Government with financial assistance from CARE; so far 115 have been built.

The employment of a literate rural woman to conduct the pre-school is the major innovative feature of the Tamil Nadu programme. Her main task is to help the children stay clean, give them their midday meal and engage them in organized play activities, in addition she tells them stories and teaches songs. Much of her work is a form of baby sitting but even this must be considered as a significant improvement in the sense that if she did not give them any attention, the children would have been unable to stay clean or become socialized, nor would they have been able to eat a proper midday meal. Since the cost of the programme is low and since each centre provides a job for a needy and able village woman the programme is likely to spread rapidly.

*Improvisation of science apparatus*

Since the publication of the report of the Indian Education Commission in 1966, school curricula have undergone a revision in many States with radical changes in the science syllabi. Instead of

general science, the separate disciplines of physics, chemistry and biology are being promoted. Most of the curricula has been modernized and deepened and the emphasis is on the importance of activities and experiments in the teaching and learning of science. This approach raises two problems: one financial and the other instructional. Firstly, the experimental methods of teaching and learning science involves the use of a variety of apparatus and the present condition of India's economic backwardness, is it possible for schools to set up well-equipped laboratories? Obviously the answer is no. Secondly, as a matter of instructional strategy, should the schools obtain the ready-made apparatus? Here, again, the answer is in the negative, but for a different reason. The improvization of scientific apparatus and equipment through the joint efforts of teachers and pupils, leads to effective teaching and learning, furthermore, this approach also provides a solution to the financial problem.

The Bombay Association for Science Education (BASE) undertook a project to produce improvized apparatus and sought guidance from both the Tata Institute of Fundamental Research (TIFR) and the British Council. The BASE demonstrated the possibility of providing most of the apparatus required for the new Standard 8 syllabus introduced in Maharashtra in June 1972 and, at the invitation of the Director of Education, the innovating teachers conducted a workshop for 30 science teachers drawn from different districts. Each participant prepared improvized apparatus from inexpensive and easily available materials, and this group, in its turn, will orientate science teachers at the district level and widen the movement for preparing improvized apparatus. An illustrated handbook, prepared by the original innovating group with the help of scientists from TIFR, has been published by the Education Department for distribution to all secondary schools in the State. A similar procedure is being adopted for improvization of apparatus, orientation of science teachers and preparation of handbooks in relation to the revised syllabi for Standards 9 and 10.

The participation of scientists from TIFR has been of vital importance in this project. In the process of transforming school science in the context of India's circumstances and also from the point of view of the rapid advance India must achieve in making its school science studies modern and efficient, the participation of the TIFR must be considered as a real breakthrough. It has begun a new movement for mobilizing India's best intellctual resources in the scientific field for transforming school educa-

tion . The enthusiasm generated among the teachers of science for providing improvized apparatus has been another major gain. The traditional myth that the teaching and learning of science cannot be universalized in a poor country because science laboratories are expensive, has to a certain extent been exploded. A new tradition of collaborative activities between the Education Department, Teachers' Associations and a national institution such as the TIFR has been initiated.

## II. Structural changes

*National Council of Educational Research and Training*

The National Council of Educational Research and Training (NCERT) is an outstanding example of a structural innovation within the education system. It was established in 1961 for promoting a large-scale programme for the improvement of school education.

Some institutions were established by the Government of India between 1956-60 for improving specific areas of education. These were the National Institute of Basic Education which focused its attention on the primary stage, the Institute of Fundamental Education which promoted programmes of Adult Education, the All-India Council for Secondary Education which prompted secondary teachers' colleges to offer extension services to secondary schools and the Institute of Audio-Visual Education which functioned as a service centre for various educational stages and projects. Established as independent units, these institutions had little communication with one another, and as a consequence their impact was negligible. The Government of India therefore decided to bring these institutions beneath the umbrella of the NCERT in order to co-ordinate their activities. The NCERT was an autonomous organization so that it had sufficient freedom of action and flexibility in its administrative and financial procedures, with research, training, extension and publications as its major functions. Its general constitutional framework made the NCERT subordinate to the Ministry of Education, nevertheless, its establishment as the principal technical agency functioning at the national level for the improvement of school education was a forward step. In the early years its programmes were unable to be developed because there was no parallel agency at the State level with which it could communicate directly. With the establishment in 1964 of the State Institutes of Education, direct communication was possible between the NCERT and the State Education Departments.

The Indian Education Commission which studied the working of the NCERT, suggested some reorganization of its functions and

administration. While appreciating the necessity for such an institutional innovation, the Commission emphasized that its success depended on an in-built provision for continuous self-evaluation leading to readjustment of its programmes. In 1970, a Review Committee investigated the working of the NCERT and tried to clarify its objectives with a view to assessing its general impact on school education in the country. The Committee pointed out that the teaching aspects of educational improvement are a national concern, but for a successful implementation of programmes for this purpose, five essential factors must be considered together:

(i) The formation of an organization at the national level which will bring together groups of competent professional persons who will devote themselves to an intensive study of the different aspects of this problem.

(ii) The formation of similar organizations or groups of professional persons at the State level.

(iii) The active involvement of universities in programmes of improving school education.

(iv) The building of a close collaborative relationship between these three groups of professional workers and institutions

(v) Close involvement of outstanding school teachers in all these efforts for the improvement of school education.

The NCERT could play a major role in the programme of school improvement by acting as a catalyst which promoted and accelerated activities for crucial improvement programmes. This can be achieved if it has a high professional expertise within itself and establishes close liaison with organizations and agencies in the States and in the universities. Only through such channels can innovations and techniques evolved by the NCERT become widely known. NCERT contacts with State Institutes of Education and of Science Education are quite close and frequent. Thus, a good base for its future work already exists. The Review Committee has, therefore, recommended that the Government of India enacts suitable legislation and declares the NCERT an institution of national importance. While recommending the representation of officials from the State Education Departments on the NCERT, the Review Committee has argued that this will benefit the Council's activities helping it to understand the problems of school improvement at the State level and to make its programmes more acceptable to

the States. An exchange of staff between university departments interested in improving school education and some of the NCERT departments is recommended for developing co-operative and collaborative projects of research and development.

During its ten years of existence, the NCERT has prepared several publications, its most significant contribution being in the field of curriculum development, particularly in science and social studies. In addition, the international contacts of the NCERT have increased with beneficial effects on its standard of work. A comprehensive view of the work done by the NCERT proves the need for such a national organization, and it has come to be accepted by the State Education Departments as an agency which could give considerable support to the State Institutes of Education. The NCERT realizes, nevertheless, the necessity for support from the State Institutes of Education if its research and development programmes are to be founded on the reality of the educational situation.

*State Institutes of Education*

The Union Ministry of Education established several institutions for the qualitative improvement of school education at the same time as the States established institutes and units such as the Vocational Guidance Bureau, Audio-Visual Institutes, Evaluation Units and Science Education Units. These separate institutions were combined under a single organization, namely, the National Council of Educational Research and Training, and as this step yielded good results, a similar programme was suggested by the Ministry of Education to the States. In 1963, the Ministry of Education offered the States the scheme of the State Institutes of Education with full financial assistance from the Central Government. This was considered an important action for the programmes of qualitative improvement of education which were expected to be launched during the Fourth Five-Year Plan. The role of the State Institutes of Education was to function within the Directorate of Education as an agent for promoting the academic functions of the Directorate and creating in the State a favourable climate in the planning and implementation of programmes of qualitative improvement. Initially, many States quickly accepted the scheme because it brought them 100 per cent government assistance for staffing and equipment, and at the Ministry's request they also selected some of their best officers for conducting

the Institutes. The Ministry of Education organized for a special six-week orientation programme during which educational problems were discussed and each officer prepared a three-year detailed plan of the tasks to be undertaken by his Institute. This included details for the provision of accommodation, equipment, personnel and financial and administrative facilities.

Some States saw the considerable potential inherent in the very concept of the State Institutes for bringing about rapid educational improvement and began to develop them enthusiastically. Others used the grants from the Central Government to perpetuate some of the traditional practices in teacher education and school education. While some Institutes took under their aegis the entire range of school education, others turned their attention more to either primary education or to secondary education. Some Institutes established contacts with universities for collaborative research programmes, and others worked in comparatively intellectual isolation. A few Institutes deteriorated into the traditional but better equipped teacher training colleges. The Indian Education Commission, whilst reviewing the scheme of the State Institutes of Education, stressed its value for transforming the Directorate of Education itself into a type of adminstrative structure more able to undertake its academic functions. The Commission, therefore, recommended that the academic wing of the Education Department should develop such programmes as:

(i) In-service training for all officers of the Department and for all teacher educators.

(ii) Improvement of teacher education, preferably through a State Board of Teacher Education which would work in collaboration with the State Institute of Education.

(iii) Revision of curricula and improvement of examinations.

(iv) Research and evaluation of programmes of educational development.

(v) Publications

With regard to research and evaluation, the Commission said: 'At present, this is a mostly neglected area. It would be a responsibility of the State Institutes of Education to develop this area in collaboration with the universities and training colleges.'

The progress of the State Institutes has varied. In appointing staff to this new structure within the Directorate of Education, seniority was sometimes considered more important than competence, and where competence gained precedence over seniority, the envy

and opposition of those that had been bypassed reached such a pitch that the Insitute's programmes had to face not only an occasional rebuff but even consistent opposition. The role of the Institute and its staff was sometimes misinterpreted as that of a dominating group which arrogated to itself the right to train and guide the officers of the Department. Whenever the Institutes received understanding and support from the Director of Education and especially the Minister of Education, much outstanding work was in evidence.

Though sometimes avoided by the official cadres, the Institutes and their programmes usually gained an enthusiastic response from teacher educators and teachers. For the first time in the history of the State Education Departments, a channel had been cleared for them to hold free educational dialogues with the departmental officers. In addition, opportunities which the Institutes began to offer to teachers and teacher educators to come together on a common platform for academic debate and for undertaking experiments and investigations, won for the Institutes a place of respect. After the report of the Indian Education Commission had spelt out the roles and functions of the Institutes, they progressed as legitimate academic wings of the Directorate of Education. In most States, they are gradually becoming recognized as a necessary part of the Directorate of Education for transmitting new schemes of educational improvement, launching innovations and experiments in education and, most important, maintaining a continual dialogue with the teaching profession. If anyone has to be given the credit for breaking the traditional isolation of the Education Department and the rigidity of its attitude vis-a-vis the teaching profession, then it is the State Institutes of Education. It is doubtful, however, whether the Institutes could have achieved even their present moderate success if their initial expenditure was unable to be met fully by the Central Government. Moreover, the Ministry of Education consistently supported their programmes and kept up staff morale through seminars and conferences at which they could re-examine and readjust their programmes. Finally, it was the discerning support given by the Education Commission that firmly installed the State Institutes of Education as an innovation to be reckoned with in India's educational world.

*State Board of Teacher Education*

In 1965, the Government of Maharashtra appointed a special Committee to review the problems and patterns of teacher education in the State and to make recommendations for evolving a rational and integrated pattern of teacher education for supplying compe-

tent teachers to the pre-primary, primary and secondary stages for handling the probable changes in curricula and teaching techniques. While submitting a detailed report, the Committee stated:

'We agree that the necessity to critically examine the problems of teacher education has become especially compelling in view of the recent demand on education to adjust itself to many unexpected upheavals in the goals and organization of our society.

'The solutions and approaches which have appeared quite efficacious in the past are proving inapplicable to the present situation. This attempt at a re-examination of the problems and provision of teacher education, therefore, has to locate not just the points where the existing provision has been responding inadequately to the goals and practices of school education, but also has to keep in view the changes that are taking place in education as a whole. The necessity for a new direction is no longer a matter of controversy. Most people now agree that the challenge of new situations can be met only through new responses.'

The Committee emphatically supported the recommendations made earlier by several All-India committees (and subsequently by the Indian Education Commission in 1966) to create a State Board of Teacher Education for the organization and supervision of teacher education in the State. It argued:

'No new programme, designed to overcome the inertia of traditional practices can either be implemented or accelerated through the instumentality of traditional agencies. New visions and fresh energies come into play only when a new agency for change comes into existence. By the very reason of its birth, it releases strong currents of change into its field of operation and galvanizes it into fresh activity. Therefore, if the programmes of teacher education in the State are to be integrated, upgraded and revitalized, the State Board is the first and foremost point for urgent implementation. It is only in the wake of this reform that all other desirable changes in teacher education can enter the realm of attainability.'

A pioneering step was taken by the State of Maharashtra when it established the State Board of Teacher Education in 1967. Two years later, the State of Gujarat established a similar Board. Other States have been actively considering this innovation for implementation.

The State Board of Teacher Education in Maharashtra brought together, for the first time, educational experts and teacher educators from pre-primary, primary and secondary stages. The

membership of the Board includes representatives from all the universities in the State, prominent teacher educators and representatives of associations of teachers and teacher educators, and innovators in teacher education. Before the establishment of the Board, curricula for the training of pre-primary and primary teachers were prepared by the ad hoc committees appointed by the Education Department. Institutions of teacher education which had to implement the curricula were hardly ever consulted in their formulation. Training institutions at the secondary stage, functioning under six different universities in the State, were following different styles of curricula some of which were almost on the verge of obsolescence. There was no communication among the teacher-education faculties of the various universities nor was there communication between the secondary, primary and pre-primary levels of training. Teacher educators at no stage ever came together for mutual exchange of views.

The State Board of Teacher Education broke new ground when it brought together all these different interests. With large-scale participation of various interests connected with teacher education, the Board constructed fairly modernized curricula and examinations for pre-primary, primary and secondary teachers. The curriculum for secondary teachers was in the form of a recommendation because this stage of training is controlled by the universities.

An unprecedented procedure was followed for formulating and finalizing the curricula for pre-primary and primary teachers. First, a committee of experts prepared drafts on the basis of the recommendations of the Maharashtra Teacher Education Review Committee and the Indian Education Commission. These drafts were sent for scrutiny and suggestions to several educationists and prominent teacher educators. Every teacher training institution was supplied with enough copies and requested to discuss the drafts in a faculty seminar and send their comments to the State Board. Hundreds of suggestions were received. These were analysed and classified with a view to modification. A conference of principals of all the 144 teacher training institutions in the State was then convened for an open discussion for the modified drafts. The consolidated viewpoints of this conference were considered by a committee of experts in teacher education and the draft curricula were finalized. The implementation of the new curricula began in June 1968, and handbooks were prepared for

teacher educators to enable them to implement the curricula. Several seminars, workshops and training sessions for teacher educators were held to help them acquire the skills essential for the new training techniques and examinations accompanying curricula changes. In addition, teacher training institutions were requested to treat their curricula as experimental and to note their findings on their different aspects.

At the end of two years, two conferences of principals were again convened to ascertain the curricula's suitability, and further revision was carried out with their help. The reconstructed curricula began to be freshly implemented in the training institutions from June 1970. This entire process of curricula construction involved the participation of its practitioners. The process gave an opportunity to the principals not only to acquaint themselves with their new directions in teacher training, curriculum construction and examinations, but to develop a rational understanding of the complex relationship of teacher training and educational quality in a country beset by scarcity of resources. It would be incorrect to say that each and every principal or teacher educator has taken kindly to these changes in roles and processes. In the traditional authoritarian manner, principals had no opportunity of questioning the academic actions of administrators and supervisors; nor did the teacher educators ever query the directions given by the principals. But when the administrators themselves induced the principals to raise questions a chain reaction led teacher educators to discuss academic questions frankly in faculty meetings. Some principals resented this trend, but the traditional hierarchical structure cannot now be reconstructed. This is no less because the new participatory process of decision making has made the teacher-training institutions more stimulating places, full of intense activity.

*State Textbook Publishing Corporation: Bihar*

The provision of good school textbooks, particularly in the primary stage, presents many problems in India where the numbers to be supplied are very large. Any publisher of school textbooks makes large profits even if the margin of profit is kept low. But private publishers who operate from profit motives, either increase their prices, or keep the cost price as low as possible by reducing the quality of production. Good writers hardly ever accept offers to prepare textbooks because the remuneration

offered by the publishers is inadequate. The low quality of textbooks has been a major handicap in maintaining satisfactory standards of instruction.

Since 1964 the Ministry of Education, Government of India, has made suggestions to the State Education Departments to take over the preparation and production of school textbooks at least for the primary stage. The rationale behind this suggestion is that firstly, as primary education is compulsory, it makes it the duty of the State to see that the basic minimum tool of learning, i.e. the textbook, is supplied to a school child at as low a price as possible. Secondly, the State Government should ensure that as the textbook is the only tool for teaching and learning in most of the Indian primary schools, the quality of the tool should be of a high order. Thirdly, the amount of paper required for the provision of textbooks at the primary stage is colossal and with the growing shortage of paper, it needs to be seen that the available stocks of paper in the country are utilized with due care and economy. When several private publishers produce textbooks for the same grades, it is not possible to regulate the quantity of paper used. Therefore, a single channel of production would be desirable.

Some States have taken active steps to establish textbook production organizations. In most States, these are autonomous and receive financial assistance from the State Government. While most of these produce primary education textbooks, some have also undertaken the production of secondary level textbooks. These organizations are flourishing on a more or less commercial basis, but they have been able to supply quality textbooks at a low price. The Bihar State Textbook Publishing Corporation is a good example of a new educational venture undertaken by the State Governments through the creation of a new structure.

The establishment of the Corporation was preceeded by the establishment in January 1964 of a Departmental Committee set up by the Government of Bihar to look thoroughly into the problems connected with all aspects of textbooks in the State. This Committee recommended the establishment of an autonomous body under the Companies Act, 1956, to be run strictly on commercial lines and equipped with its own modern printing press. The Corporation began to function in April 1966 with all its shares in the name of the Governor of Bihar. It has a Board of Directors with the Education Minister as Chairman, and its business is regulated by its Memorandum of Association and Articles of Association as

well as the provisions of the Companies Act. There are eight other Directors, one of these being a representative of the Ministry of Education, Government of India. Except for two non-officials, all the Directors are Government officers. There are three methods by which the Board prepares its manuscripts: (i) adapting model textbooks prepared by the NCERT; (ii) commissioning suitable authors selected from a panel of writers approved for each subject; and (iii) inviting manuscripts through open competition. The rates of payment to writers, scrutinizers and translators were calculated after taking into consideration the rates of payment adopted by private publishers. The total requirement of textbooks in Bihar in 1970 was about 30 million copies for classes I to II. However, unable to undertake such a large production programme, the Corporation aimed at producing 10 million copies, and according to the schedule prepared by the Corporation, the target of 30 million copies would be reached within about five years. Since the Education Department is the only competent authority to effect changes in the courses of study, the schedule for curriculum change and textbook production is properly co-ordinated. As soon as a new book is prescribed, the Corporation initiates an orientation programme of teachers with the help of the State Institute of Education and in collaboration with the NCERT. The master-trainers are orientated by the NCERT and the State Institute of Education and are then assigned the task of conducting the training of officers and selected teachers at the district level. Teams formed from among this trained cadre undertake the orientation of primary teachers. The funds for organizing these courses are shared by the State Government and the Corporation.

The printing of textbooks is generally done through private tender, since the Corporation's own press cannot take the entire load. For distribution, an innovative measure has been adopted by appointing the Teachers' Co-operative of Bihar as a wholesaler. The Teachers' Co-operative makes an appreciable amount of profit from the commission it derives on sales, and these funds are used for the professional development of teachers and assistance to teachers in need.

For several years, Bihar has been plagued by the appearance of spurious textbooks. Copies of standard textbooks are produced by unscrupulous printers on low quality paper and distributed to retailers for sale at a high commission with the result that

these copies are sold more quickly than the authentic ones. In order to prevent such malpractices, the Corporation maintains a special Intelligence Squad.

The Corporation is a thriving concern. In the first four years of its existence the gross sales amounted to 12,838,000 rupees, and a dividend was declared at the rate of 9 per cent in the first year and 10 per cent in the second and third years. In the first three years, it also built up a general reserve fund of about Rs. 4,50,000. All profits are ploughed back by the Corporation for improvement of textbook quality and for making the organization of its work more efficient. As a commercial structure attached to the Education Department, the Corporation and its counterparts in other States are introducing the elements of systems approach and operational research in an educational undertaking, and when one considers the rule-of-thumb methods which have prevailed in educational administration so far, the introduction of these elements must seem quite a revolution.

*National Staff College for Educational Planners and Administrators*

It has been impossible for most of the State Education Departments in India to keep track of educational change and development, not only overseas but also in the different parts of their own country. Each department worked more or less in isolation and conducted its affairs in a traditional manner. A speedy transformation of educational administration is essential for bringing about a comprehensive transformation of the educational system in India, but this matter has received little attention. To quote an eminent Indian educationist :

'... the expansion and improvement of educational administration has generally been neglected, with the result that the Education Departments of today are far less equipped to deal with the immense tasks of educational reconstruction than they were at any earlier time....the earlier "police" traditions of the administration, (i.e. during British rule) still continue to dominate the Indian scene, although in a different context....What is needed is a substantial increase in personnel of the Education Department and a revolution in its character, that is to say, its conversion from a body of men who deal mainly with statistics, financial sanctions, grants-in-aid,

transfers and appointments and investigate all sorts of complaints, into an organization of educationalists who would be imaginative enough to realize the goals of educational reconstruction, sensitive enough to know the needs and demands of the people, competent enough to plan satisfactory programmes of educational reconstruction and to implement them with success, and able enough to function as the friends, philosophers and guides of teachers, who in their turn, would extend a similar service to parents and students.'[1]

To remedy this situation, the Indian Education Commission recommended the establishment of a National Staff College for Educational Planners and Administrators. The purposes of the Staff College are to undertake extensive research in problems of educational planning and administration, provide consultancy and extension services for the diffusion of new administrative practices, and arrange for the orientation of all senior administrators of education at the Centre and in the States through suitable programmes.

The Ministry of Education realized that the establishment of the National Staff College would require certain academic preliminaries, and decided to utilize the readily available set-up of the Asian Institute of Educational Planning and Administration (New Delhi) to develop an 'Indian programme' alongside the Institute's Asian programme. The 'Indian programme', was begun in 1969 and was specially designed for stimulating further thinking on the problems of educational administration in India and for initiating a few activities which would explore the dimensions of some of these problems. It consisted of a programme of State-level seminars on educational administration and planning; on-the-spot study of significant educational practices and institutions developed by each State; and the constitution of study groups consisting of educationists, educational administrators, development planners and experts in management in order to formulate a plan for launching the programmes of the Staff College in an appropriate manner.

The Staff College is an autonomous organization. During the past two years, it has built up contacts with the State Educa-

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1. Naik, J.P. *Educational planning in India*. New Delhi, Allied Publisners, 1965. p. 37-38

tion Departments and other relevant organizations for identifying the kind of persons required for its faculty. It is the policy of the Staff College to recruit only a part of its faculty on a permanent basis and employ on a contract basis the bulk of the senior professional staff from the Central Government, State Education Departments, universities, research institutions and other organizations. Some staff would be recruited only for special assignments or specific projects and programmes. This flexible arrangement in staffing is expected to bring a high quality into the Staff College's programmes and also facilitates the cross-fertilization of ideas in educational planning and administration. Exchange of personnel between the Staff College and various other organizations would automatically prevent hierarchical rigidity. This structural innovation has had no precedent in the educational system of India. Though models of similar organizations in other countries, particularly in Britain, have been studied in formulating the concept of the Staff College for Educational Planners and Administrators, its objectives are quite different and are geared to the development of a system of educational administration required by a developing country.

*Central Institute of Indian Languages*

One of the noteworthy structural innovations supported by the Government of India is the Mysore Central Institute of Indian Languages, an outcome of the Government's Resolution on Language Policy adopted by both Houses of Parliament in January 1968. As described in the Institute's statement of purposes and the mode of operation: 'Language teaching in India at the present time is characterized by inertia. All efforts at innovation so far have proved futile. In this age of education explosion, we cannot afford such inertia. We have to bring life into it and embark upon well-considered reforms and accelerate the pace of their implementation.'

In order to achieve these objectives the Institute is expected to undertake innovative measures and to conduct training courses for developing methods, materials and aids for teaching Indian languages scientifically. It also intends to bring together the research and literary outputs of the various linguistic streams and to identify similarities among different Indian languages in terms of history, vocabulary, cross fertilization,

grammar, linguistic structure, literary and cultural themes and subject content. It will then act as a clearing house for information on all matters relating to the development of Indian languages in the country and overseas. A major task is the study of tribal languages with a view to devising suitable material for teaching Indian languages to the tribal people. In addition the Institute intends teaching tribal languages to interested administrative and cultural personnel. It is essential to develop meaningful inter-disciplinary collaboration among linguistics departments of universities and to co-ordinate the efforts of their language departments to give an impetus to scientific work in the study of linguistics. The Institute will thus promote the formulation and execution of important co-operative projects in language research and also in applied linguistics. For this purpose, it has begun to hold seminars, workshops, summer institutes and short-term courses. In addition, it attempts the application of language technology to Indian languages with a view to promoting their use in recording and communication.

With a view to implementing the three-language formula enunciated by the National Policy on Education, the Central Institute conducts four Regional Centres at Bhubaneswar, Poona, Patiala and Mysore to serve respectively the eastern, western, northern and southern regions of the country. These provide 10 months, intensive training in Indian languages to secondary school teachers deputed by State Governments. The main object of the programmes is to provide an equal incentive to all Indian States to implement the three-language formula and to offer assistance (i) to Hindi-speaking States to get some of their teachers trained in a non-Hindi language, and (ii) to non-Hindi States to get some of their teachers trained in an Indian language other than their State language and Hindi. Apart from teaching regional languages, these Centres train the deputed teachers in the methodology of language teaching by giving them linguistic orientation and enabling them to prepare their own teaching materials for use after the completion of their training. The Mysore Centre can train 80 teachers in one course, whilst the other Centres can train 60 teachers each. A language laboratory is attached to each of these Centres, and the trainees use this for learning a regional language and also for developing skills in handling language laboratories. The Regional Centres have prepared phonetic readers in the 14 regional languages and in their courses they have

found it possible to transmit the knowledge of quite an unfamiliar language within a relatively short period.

The Central Institute of Languages is a striking example of the need to create non-traditional structural arrangements for the implementation of innovative policies like India's National Policy on Education and Policy on Languages.

*Indian Council of Social Science Research*

Research findings and investigations in social sciences provide the foundations for creating an educational system which is efficient, relevant and future related. A major problem is how to promote research quantitatively as well as qualitatively and to stimulate the utilization of the results for policy formulation. It is not enough to say the universities will take care of this, partly because the emphasis in universities is on teaching and partly because there are several research institutions outside the university system. To meet this problem a special national organization for the promotion of research in social sciences is often established. This expedient, utilized in advanced countries, can also be adopted with suitable modifications by a developing country like India. The establishment of the Indian Council of Social Science Research is an example of such an adoptive innovation.

In India, the Council for Scientific and Industrial Research was established as early as 1944 for promoting research in the natural sciences, but there was no similar agency to promote research in the social sciences. The Indian Council of Social Science Research was, therefore, established by the Government of India as an autonomous body in 1969. During its three years of its existence, it has been able to achieve a good deal and has broken fresh ground in many fields.

Several aspects of the work of this Council have an innovative character and deserve attention. For instance, the Council decided to play a non-competitive role in the sense that it gave financial support to the research undertaken by universities and research institutions but conducts no research on its own — a policy which has enabled it to establish good relations with the universities and research organizations. Similarly, it has decided not to establish any research institutions under its direct control. A special feature is its efforts not to bureaucratize itself. It maintains a comparatively small office and for the promotion of its activities uses the part-time services of a large number of

social scientists *in situ*. It has also tried to avoid the danger of complacency or power politics which often threatens grant-giving organizations, by developing a close and intimate contact with the academic community, and by undertaking a fairly large programme of promotional activities in research as well as the provision of documentation and bibliographical facilities.

## III. Curriculum and instructional techniques

*Inclusion of work experience in the secondary school curriculum*

The Indian Education Commission stressed the need for changing the bookish character of school education by introducing into the curriculum a programme of work experience. Earlier, the scheme of basic education as formulated by Gandhiji and his colleagues had been tried out at the primary stage. Though strongly supported by educationists, its implementation had failed mainly because the envisaged difficulties in its large-scale field trial had been incorrectly ascertained. The introduction of work experience had to avoid this error, so on a suggestion from the Ministry of Education, the Maharashtra Education Department decided to conduct an action-research project for introduction of work experience in the secondary curriculum.

If work experience activities in schools are to be realistic they must be linked with the occupational structure in the midst of which the schools function. But as systematic studies of the occupational structure at the district level had never been carried out in any part of the country, the planners of the project decided to conduct an occupational survey for one of the Maharashtra districts. The rural district of Osmanabad which is economically backward was selected for this purpose. Being the first survey of its kind, a new methodology had to be evolved, and the survey report identified the decaying and emerging occupations in the district. It also recorded information on secondary school 'drop-outs' and their occupational inclinations.

This information indicated a two-pronged approach to the problem of introducing work experience at the secondary stage : while elementary activities related to technology and agriculture could be tried for 'in-school' youngsters, a new curriculum combining general education with occupational training for immediate use would have to be developed for 'out-of-school' youth. In order to discuss the problem with all its ramifications and to prepare a programme of action, a Programming Workshop on Occupational Educa-

tion and Training was organized by the State Institute of Education, Maharashtra, in 1969. Experts in such areas as education, economics, industry, agriculture, commerce and youth employment participated and technical advice was received from the Ministry of Education and the Ford Foundation (India), the latter shared financial responsibility for the project with the State Government.

The establishment of the Occupational Education and Training Cell in the State Institute of Education was recommended, and the methods for conducting the action-research project were formulated in detail.

In 1970 the Cell began to function and occupational surveys of three more districts were carried out. In the first phase of the action-research project, the Cell organized meetings of headmasters and secondary teachers from the four selected districts in order to see if it was possible to develop a meaningful work-experience curriculum. The headmasters and teachers decided to find out (i) the probable areas of work experience ; (ii) the cost of conducting these projects; (iii) the time element involved in the various operations in a project ; (iv) whether work experience could be adjusted in the normal school timetable ; (v) the kind of skills required by the teachers ; and (vi) the teaching-learning materials necessary for putting across the programme. In a second workshop of teachers and experts in agriculture and technical education, tentative curriculum units were prepared for the different areas of work experience suggested by teachers and headmasters and these were tried out in 76 secondary schools which had volunteered to participate in the experiment. No special grant-in-aid for this purpose was given to any school, but the expenditure on meetings, the cyclostyled teaching-learning materials, and the teacher training for conducting the action-research project was borne by the State Institute of Education. The schools were permitted to incur expenditure on equipment and materials out of their normal grant-in-aid. Selected both from urban and rural areas, these schools tried out a variety of locally relevant work-experience activities.

At the end of the first phase a workshop was held for all the teachers and the various components of their work-experience programmes were reviewed. The instructions for pupils and suggestions for teachers were reorganized, elaborated and developed as a handbook for teachers and workbooks for students.

In the second phase, begun in 1972, it was decided to test the material and other findings of the first phase in a sample of 570 schools from all over the State at the rate of about 20 schools from each district. These 570 schools were selected in meetings held at a district level in consultation with headmasters.

In the meantime, the Maharashtra State Board of Secondary Education had revised the secondary curriculum and included work experience as an obligatory programme for Standard 8 onwards from June 1972. Though the OTE Cell in the State Institute of Education had decided to implement work experience only in 570 schools, a large number of secondary schools had been teaching crafts of various kinds for several years and they felt that with their equipment and teachers it would be possible for them to switch over to work experience without too much difficulty. Besides, the new curriculum had reduced the time for the teaching of drawing in Standards 8 and 9 and this had led to the reduction of the work load for drawing instructors. The Association of Drawing Teachers, therefore, put in a request that their members should be trained to carry out programmes of technologically orientated work experience, particularly because they were conversant with the principles of design, modelling and technical drawing.

There are about 6,000 secondary schools in Maharashtra, and when a very large number of these schools were not included in the action-research project they insisted on being allowed to take up work-experience activities on the same lines as those designated by the State Institute and recommended by the Board of Secondary Education. This lead to a crucial decision being taken to extend the programme to schools which had not participated in the action-research project. During 1972-73, therefore, while supervised projects of work experience were being conducted in 570 schools, most of the remaining schools had begun to conduct their own programmes. When the action-research was launched in 1969, the plan was to conduct intensive orientation programmes for at least two inspecting officers and a few teachers from every district before December 1971, so that they could undertake a proper survey of work-experience possibilities at the district level and also in practically all the schools by June 1972. However, some changes in the project staff during 1970-71 led to changes in the original project proposal also.

The work-experience project carried out in the 570 schools as a part of the action-research project was evaluated by a member of

the staff of the Ford Foundation by selecting 102 schools at random. The report shows that students have been enthusiastic in accepting this programme and many of them have been working at their selected activities even after school hours.

The projects in the technologically orientated cluster includes courses in handyman's skills; production and maintenance of science apparatus; maintenance and repairs of radios, clocks and timepieces; elementary plumbing; preparation of plastic articles; maintenance and repairs of water pumps; and elementary chemical technology, etc. The agriculturally orientated cluster includes farm operations, poultry keeping, preparation of bread and biscuits, horticulture, bee keeping, food preservation, fishery, animal management, etc.

From June 1973, work experience will be universally introduced in Standard 8 and 9 for secondary schools in Maharashtra. Preparations have been made to train the required numbers of teachers and supervisors and detailed instructions have been issued by the Maharashtra State Board of Secondary Education for helping schools to select and implement activities which are in keeping with their environment and facilities. At the same time, all Colleges of Education are being encouraged to orientate every teacher trainee in some work-experience skills. Systematic training has already been introduced in primary and pre-primary teacher training since June 1968.

The reception given by secondary schools to work-experience programmes has been enthusiatic. This is obviously due to the efforts which have been made by the State Institute of Education since 1969 to propagate the idea of work experience in a rational manner, and to support it with a realistic curriculum and good teaching materials, as well as to the close collaboration between the Institute and the State Board of Secondary Education with the help of teachers and headmasters in the formulation and implementation of the curriculum.

*Work experience in industry*

The objectives of the work-experience programme are to enable pupils to grasp the essential elements involved in productivity such as planning, management, precision, persistence and the application of scientific principles and scientific method to the tasks undertaken. This approach is expected not only to build up the attitudes and skills of pupils but also encourage them to

pursue both their own interests and occupational choices. It also encourages a realistic work-experience situation through school collaboration with business, industry and farmers. The instructional techniques require a bond between the world of school and the world of work and whilst this has been tried in the past for agriculture work experience, hardly any attempt has been made to link technologically orientated work experience with industry. In the wake of the curriculum introduced in Maharashtra State, some schools and industrial concerns in Bombay set up a co-operative project for using techniques of on-the-spot training for secondary students.

The Rotary Club of Bombay East led in helping secondary schools to launch this project by forming a central committee of industrialists, educationists and Education Department Officers. The city was divided into ten areas for formulating a detailed programme of action and 10 per cent of the schools from each area were chosen to provide work experience to Standard 8 pupils from the selected schools. Each Rotary Club in the city was allocated an area for its involvement and all the arrangements were completed before the beginning of the school year; headmasters of all the selected schools were involved in this work. The responsibility for co-ordinating the projects in the ten areas was voluntarily undertaken by one of them. The students were introduced to factory organization and placed first beside skilled workers and then moved from job to job and from one level to another in order to give them an insight into various factory operations. In one of the rubber factories the management was so impressed by the students' performance that it permitted them to direct and run an entire section by themselves. The students were thus exposed to the industrial environment and came to understand the rules of management, organization, supervision, discipline and safety.

The initial project involved nearly 350 secondary schools and Bombay's Rotarians propose to continue it as it seems the best way to find satisfactory answers to the question of workshops for providing technically orientated work experience to secondary schools. Furthermore, pupils quickly become acquainted with the realities of the world of work and this may open up for them possibilities of selecting non-traditional careers and courses of studies.

*Individualized instruction*

Since educational facilities are now provided even in villages with a population of 200 to 300, the expansion of educational facilities, particularly at the primary stage, has led to crowded classes and an increase in the number of single-teacher schools. This is particularly true in Maharashtra. The difficulties which teachers experience in handling large and heterogeneous classes at the primary stage cannot possibly be overcome if traditional methods of teaching are continued. Self study and guided group work by the pupils can, however, improve the situation. In India's indigenous schools, the monitorial system made group work possible and since there were no organized examinations, each pupil could study at his own pace under the guidance of both the teacher and the more advanced pupils. One solution to the current problem of crowded classes and single-teacher schools would be to revise these old instructional techniques. Obviously, a complete return to the old techniques would be impossible because the school system of age-specific and grade-specific arrangements and annual examinations for promotion purposes, all imported by the British have become firmly entrenched. Therefore, a combination is required of the age-old self study and monitorial arrangements and of present-day techniques of individualized instruction such as programmed learning.

In 1962 the National Council of Educational Research and Training began to promote a study of programmed instruction to seek ways of using this technique in Indian conditions. Some educationists with a keen interest in research and training in programmed instruction established the Indian Association for Programmed Learning at about the same time, and training courses for staffs of State Institutes of Education and Colleges of Education were held under the auspices of both these organizations. In 1968 the State Institute of Education, Maharashtra, undertook a pilot project in programmed learning to find solutions to the problems of crowded classes and single-teacher schools. Some financial assistance for this project was received from USAID.

A feasibility study was carried out by USAID experts to consider such matters as : who was going to be educated through the programmed learning materials ; to what purpose and to what level ; whether teachers who participated in preparing and using programmed materials were ready for such an innovation ; whether the economic restaints which required that the cost of a textbook should not exceed one rupee (about 15 cents) would allow the prep-

aration of useful programmes; whether the limited supply of electricity would have to be considered and whether attention would thus have to be concentrated on preparing pencil and paper programmes alone; whether the parents and the community would accept this new technique; and whether supervisors and administrators accustomed to the exam-dominated system of the past 150 years would readily change their views and give support. When administrators and educators had explained to the USAID experts that an atmosphere of experimentation and innovation had been encouraged in Maharashtra since 1964, it was decided that the feasibility for organizing the project was quite high and that it should be launched within the limits of the States' educational system.

Programmed materials were speedily prepared by units set up in Bombay and Poona. The latter unit has finished preparing programmes for standard mathematics and science and individual and group tests have been carried out in urban and rural primary schools. Several workshops for teacher educators and teachers have also been conducted and teachers' handbooks have been prepared. Twelve charts explain the concept of programmed learning and these are used in each course and workshop. Two handbooks to accompany the Standard 4 programmes in mathematics and science have been published and two standard books on programmed learning have been translated from English into the State's regional language, Marathi. The Poona Unit proposed in 1973 to organize district-wide orientation courses for teacher educators and teachers of Standards 5 to 7 so as to prepare programmed materials. Orientation courses have also been planned for supervisors of primary schools and a lecture series has been planned for parents in order to introduce them to this new technique. Towards the end of 1973, more handbooks, brochures and pamphlets will be ready for the guidance of teachers and the programmes for Standards 5 and 6 in mathematics and science will be tried out in rural and urban schools. Finally, to support the use of programmed learning materials in single-teacher schools, a project for developing relevant audio-visual aids has been undertaken.

The results of the individual and group tests of the programmed learning materials have been encouraging. Students have taken a keen interest in learning at their own pace and reactions of primary school headmasters and teachers have been enthusiastic. Larger numbers of them wish to be given an opportunity to participate, and nearly 100 secondary school teacher educators have been

trained in the preparation of programmes and in writing handbooks for teachers. The multiplier effect is evident from the demands received by the Ibona unit to organize more training workshops and for a supply of printed and cyclostyled materials.

The project of programmed learning begun only in 1969, is a pilot project with an evaluation to be undertaken in 1974.

## IV. Teacher development

*Teachers' homes*

Tamil Nadu has initiated a project for establishing teachers' homes which, to quote the State's Director of Public Instruction will be 'a beehive of professional activities, a seedbed of innovative educational ideas and a training ground for professional leadership.' His wish was to set a new pace for the development of the teaching profession in Tamil Nadu through the Project to Advance Creativity in Education (PACE).

It was proposed to set up a teachers' home in every district under the Institute for Development of Educational Activities (IDEA). These Institutes are seen as places providing through the provision of such facilities as a library and a laboratory, a stimulating climate of study for the enhancement of professional competence. Opportunities are also to be provided for educational research and experimentation, development of teaching-learning techniques and programmes of in-service training. An appeal was made to District Education Officers and teachers organizations to examine the idea and take measures to give it concrete shape. It was anticipated that parents and the public would collect funds and give other assistance for the institutes' establishment but surprisingly, in the district of the North Arcot, the first to accept the challenge of executing the project, the 25,000 teachers decided to subscribe the necessary funds themselves and purchase outright a commodious building in Vellore city. A teachers' association was registered under the title of North Arcot Association for Teacher Welfare and Educational Advancement and under its auspices a committee was formed for the management of the home. The initial cost of the building was Rs.95,000 but further expenditure was incurred in repairing and remodelling it with a view to providing furnished accommodation for visiting teachers and a central hall for seminars.

Encouraged by the success of its fund-raising campaign, the teachers planned to run a co-operative printing press and to

construct a row of shops in the building compound to obtain funds for further activities. The teachers' association ultimately hopes to construct a three-storey building to accommodate an art gallery, library, laboratory, museum and workshop for improvized teaching aids. In addition, it has planned a scheme to extend retirement benefits of Rs.1,000 to each of its members.

These pioneering efforts have been greatly appreciated by the State Government which has sanctioned an *ad hoc* grant of Rs.50,000 for the new construction whilst other States who have learned of the scheme have suggested it to their teachers' associations. In Maharashtra, teachers have already collected Rs.100,000 for a teachers' home and the Government has given two acres of land for the same purpose.

Teachers' homes are examples of the mobilization of resources for educational development and also the release of teachers' dormant energies, thus enabling them to raise their profession to higher levels.

*The school complex*

Among the ideas proposed by the Indian Education Commission for the greater involvement of teachers in educational planning and development, that of school complexes has found favour with many States. Secondary and primary teachers from the schools included in the complex meet for institutional planning and improvement of instruction. In Maharashtra, the State Government has stimulated school college complexes.

The main objective of forming school complexes was to remove the isolation in which most schools functioned and to establish a natural channel for communication, co-operative thinking and collaboration among teachers of primary and secondary schools as well as colleges. Improvement of instruction and of their professional competence would be the main outcome and a system of professionalized school supervision might emerge from this arrangement. An important benefit was that in an educational system severely handicapped by financial constraints the 'complex' would enable a group of schools to share their facilities in terms of equipment, accommodation and specialist teachers. Furthermore, the face-to-face interaction of teachers, pupils, parents and members of the community would be a great asset for the planning and implementation of educational development in a small area.

Most Education Departments have detailed precedures for i'en-

tifying secondary and primary schools where the formation of school complexes is possible. Generally, the District Inspectors of Schools initiate the process by organizing meetings of teachers and headmasters. As soon as a group of schools expresses its readiness to establish a complex, measures are taken for its organization. Every school complex has a secondary school as its nucleus with a group of five or more primary schools surrounding it. The total number of teachers in a complex must not exceed 100 and should not be less than 60. Primary schools have to be within walking distance of the secondary school or, in sparsely populated areas, accessible by bus or bicycle within an hour. As soon as a complex is formed, the local inspecting officer calls a meeting of all the complex teachers and a programme is prepared for studying the various aspects of the schools in the complex in order to undertake co-operative projects of school improvement. A steering committee of the headmasters of all the schools concerned is formed and the headmaster of the nucleus school is nominated as its chairman, whilst a teacher from this school is asked to volunteer to work as the committee secretary. An application is then sent by the schools forming the complex to the District Educational Inspector, giving such details as the number of classes in each school, class enrolment and attendance, a subject list of teachers together with their professional and other qualifications, a list of equipment available in each school, and details about such facilities as water supply, electricity, playground, farms, library and laboratory, etc. The application is accompanied by a map showing the location of the schools and the connecting road or rail links. The Educational Inspector then has to accord approval to the complex before the summer vacation so that it may start functioning systematically in the following academic year.

After the establishment of several such school complexes, the chairmen of the steering committees are asked by the Educational Inspector to attend a seminar discussion regarding their duties, responsibilities and the probable programmes which they might undertake. On his return to his school each chairman calls a meeting of the steering committee for the preparation of a draft plan of activities. Further meetings of all the teachers in the complex are called to finalize the plan and prepare a detailed programme for the academic year. The steering committee meets each month, reviews the progress of the project and modifies some of the programmes by calling, where necessary, a meeting of teachers.

Such activities as the preparation of improvized teaching aids, social service projects, work experience, and sports and games are co-operatively undertaken by all the member schools. Teachers form subject groups of their own and discuss teaching techniques, the students' progress and new information about teaching and evaluation. The pupils are also encouraged to participate in planning some of the programmes. When decisions for the improvement of school facilities have to be made, or discussions held on the means of improving attendance and examination results, certain parents are normally invited for a conference. With minor variations, this method is followed in most of the States which have adopted the idea of school complexes.

In Maharashtra, a strong move towards school complexes and college school complexes has been launched. Arts and science colleges enable the secondary schools in the vicinity to profit by the library and laboratory facilities and the State Government has selected 16 such complexes for an annual grant-in-aid of Rs.2,000 each. However, there are many colleges which have taken the initiative in establishing co-operative programmes with nearby secondary schools, and such voluntary complexes function without government assistance. The most popular programme is the reorientation of secondary science teachers and the improvization of science apparatus. One college in a rural area has acquired a jeep and can now give demonstrations of science experiments to both secondary and primary schools within a radius of 20 miles. A lending system has also been established by this college to enable schools to borrow apparatus, books and different kinds of equipment for increasing the interest of science pupils.

An enthusiastic reception has been given by the teaching fraternity to the programmes of these complexes as many believe the connection which a 'complex' establishes between the traditional 'stages' of education and their teachers will remove class distinctions which exist between the teachers of primary, secondary and collegiate institutions. Other possibilities of the complexes are: the utilization of primary, secondary and college teachers as instructional 'teams'; introducing a 'mentor' system which can obtain the services of advanced students and community members as instructors; providing a year-round opportunity of self-training to teachers; and developing the complex as a 'common facilities area' which enables the collaborating institutions to share their resources.

## V. Some generalizations

The magnitude and urgency of the challenges to be faced in a developing country such as India and the availability of funds and expertise are usually to be found in inverse proportions. Educational planners, administrators and teachers have to function in a situation fraught with the continuing dilemma of the imperatives of change and development on the one hand, and the severe restraints of tradition and shortage of resources, on the other. In spite of this predicament they are racing against time to compete with better educational provisions elsewhere in the world. The strain is great: a few individuals and organizations perceive the urgency of finding unconventional ways of conducting different aspects of the educational system, but more often than not they are outnumbered by those keen to hold fast to tradition. In the resulting turmoil, though innovations might arise and take shape swiftly, their careful piloting and systematic diffusion present many difficulties. From this standpoint, the struggle which Indian educationists have waged since the advent of independence appears to have been fairly rewarding.

Each educational project has not been based on entirely new ideas, but has often consisted of the pragmatic adaptation of an old idea in the light of the current situation. For instance, the Education Commission's work-experience programme incorporates the best aspects of the basic education system as well as those of such programmes in advanced countries.

Most innovations attempted so far in India highlight greater input of human effort than of finance with strong administrative leadership. Structural changes abound because new programmes cannot be planned and implemented through outmoded systems — the most striking finding is that administrators have discarded their authoritative mantles and now welcome the entry of the teaching profession and the community into the traditionally holy precincts of the educational system. In the Indian States where this phenomenon has been much more in evidence, the innovative mood has spread faster.

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## Questionnaire (11)

*To develop the series further, it would be helpful if readers could record their impressions and inform the IBE. (Please write 'yes' or 'no' in the space following each question. Further comments may be written on the back of this sheet.)*

1. Do you find the author's analysis useful for your own work? ☐ in particular, is it:
   - an adequate survey of the field? ☐
   - a basis for further discussion and study? ☐
   - too abstract to be useful? ☐

2. With regard to the sources cited, could you indicate any recent documents of a similar type which have been overlooked?

3. Can you indicate any cases of innovation in your own country (or field of specialization) which you feel might have interest for other countries if adequately written up? Please name the person or institution able to provide further information about the project.

Please indicate your name and address and return this questionnaire to: the International Bureau of Education, Palais Wilson, 1211 Geneva 14, Switzerland or, when applicable, to your Unesco Regional Office for Education (i.e. Bangkok, Dakar or Santiago).